Σ-Ⅱ SERIES SGDH

FULLY CLOSED INTERFACE UNIT

USER'S MANUAL

MODEL: JUSP-FC100

YASKAWA

MANUAL NO. SIE-C718-5

Safety Information

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

⚠ WARNING Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.

⚠ CAUTION Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

⃠ PROHIBITED Indicates actions that must never be taken.

The warning symbols for ISO and JIS standards are different, as shown below.

ISO	JIS

The ISO symbol is used in this manual.

Both of these symbols appear on warning labels on Yaskawa products. Please abide by these warning labels regardless of which symbol is used.

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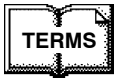
Visual Aids

The following aids are used to indicate certain types of information for easier reference.

◀EXAMPLE▶ Indicates application examples.

Indicates supplemental information.

IMPORTANT Indicates important information that should be memorized, including precautions such as alarm displays to avoid damaging the devices.



Indicates definitions of difficult terms or terms that have not been previously explained in this manual.

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Overview

■ About this Manual

This manual provides the following information for the Σ-II Series SGM□H/SGDH-□E Servodrives.

- Procedures for installing and wiring the SERVOPACK and Option Unit.
- Procedures for trial operation of the Servodrive.
- Ratings and specifications for standard models.
- Procedures for maintenance and inspection.

■ Related Manuals

Refer to the following manuals as required.

Read this manual carefully to ensure the proper use of Σ-II Series Servodrives. Also, keep this manual in a safe place so that it can be referred to whenever necessary.

Manual Name	Manual Number	Contents
Σ-II Series SGM□H/SGDH User's Manual Servo Selection and Data Sheets	SIE-S800-32.1	Describes the procedure used to select Σ-II Series Servodrives and capacities.
Σ-II Series SGM□H/SGDH User's Manual Design and Maintenance	SIE-S800-32.2	Provides detailed information on SGDH SERVOPACKs.

Using This Manual

■ Intended Audience

This manual is intended for the following users.

- Those designing Σ-II Series Servodrive systems.
- Those installing or wiring Σ-II Series Servodrives.
- Those performing trial operation or adjustments of Σ-II Series Servodrives.
- Those maintaining or inspecting Σ-II Series Servodrives.

■ Description of Technical Terms

In this manual, the following terms are defined as follows:

- **Option Unit** = JUSP-FC100
- **Servomotor** = Σ-II Series SGMAH, SGMPH, SGMGH, SGMSH, or SGMDH Servomotor.
- **SERVOPACK** = Σ-II Series SGDH-□□□E SERVOPACK.
- **Servodrive** = A set including a Servomotor and Servo Amplifier.
- **Servo System** = A servo control system that includes the combination of a Servodrive with a host computer and peripheral devices.

■ Indication of Reverse Signals

In this manual, the names of reverse signals (ones that are valid when low) are written with a forward slash (/) before the signal name, as shown in the following examples:

- /S-ON
- /P-CON

Safety Precautions

The following precautions are for checking products upon delivery, installation, wiring, operation, maintenance and inspections.

■ Checking Products upon Delivery

⚠ CAUTION

- Always use the Servomotor and SERVOPACK in one of the specified combinations.
  Not doing so may cause fire or malfunction.

■ Installation

⚠ CAUTION

- Never use the products in an environment subject to water, corrosive gases, inflammable gases, or combustibles
  Doing so may result in electric shock or fire.

■ Wiring

⚠ WARNING

- Connect the SERVOPACK ground terminal effectively to a system grounding conductor or grounding electrode (100Ω or less).
  Improper grounding may result in electric shock or fire.

⚠ CAUTION

- Do not connect a three-phase power supply to SERVOPACK U, V, or W output terminals.
  Doing so may result in injury or fire.
- Securely fasten the power supply terminal screws and motor output terminal screws.
  Not doing so may result in fire.

■ Operation

⚠ WARNING

- Never touch any rotating motor parts while the motor is running.

  Doing so may result in injury.

⚠ CAUTION

- Conduct trial operation on the Servomotor alone with the motor shaft disconnected from machine to avoid any unexpected accidents.

  Not doing so may result in injury.

- Before starting operation with a machine connected, change the settings to match the parameters of the machine.

  Starting operation without matching the proper settings may cause the machine to run out of control or malfunction.

- Before starting operation with a machine connected, make sure that an emergency stop can be applied at any time.

  Not doing so may result in injury.

- Do not touch the heat sinks during operation.

  Doing so may result in burns due to high temperatures.

■ Maintenance and Inspection

⚠ WARNING

- Never touch the inside of the SERVOPACKs.

  Doing so may result in electric shock.

- Do not remove the panel cover while the power is ON.

  Doing so may result in electric shock.

- Do not touch terminals for five minutes after the power is turned OFF.

  Residual voltage may cause electric shock.

⚠ CAUTION

- Do not disassemble the Servomotor.

  Doing so may result in electric shock or injury.

- Do not attempt to change wiring while the power is ON.

  Doing so may result in electric shock or injury.

■ General Precautions

Note the following to ensure safe application.
• The drawings presented in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual. • The drawings presented in this manual are typical examples and may not match the product you received. • This manual is subject to change due to product improvement, specification modification, and manual improvement. When this manual is revised, the manual code is updated and the new manual is published as a next edition. The edition number appears on the front and back covers. • If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual. • Yaskawa will not take responsibility for the results of unauthorized modifications of this product. Yaskawa shall not be liable for any damages or troubles resulting from unauthorized modification.

1

Checking Products and Part Names

This chapter describes the procedure for checking Σ-II Series products and the Option Unit upon delivery. It also describes the names of product parts.

1.1 Checking Products on Delivery . . . . . 1 - 2
1.2 Product Part Names . . . . . 1 - 3
1.3 Mounting the Option Unit . . . . . 1 - 4

1.1 Checking Products on Delivery

The following procedure is used to check products upon delivery. Check the following items when products are delivered.

Check Items	Comments
Are the delivered products the ones that were ordered?	Check the model numbers marked on the nameplates of the Option Unit. (Refer to the descriptions of model numbers on following pages)
Is there any damage?	Check the overall appearance, and check for damage or scratches that may have occurred during shipping.
Can the Option Unit be installed on the SERVOPACK used?	Check the model number given on the SERVOPACK nameplate. The model number must contain “SGDH” and “E” as shown below to support the Option Unit. SGDH-□□□E-□

If any of the above items are faulty or incorrect, contact your Yaskawa sales representative or the dealer from whom you purchased the products.

■ External Appearance and Nameplate Examples

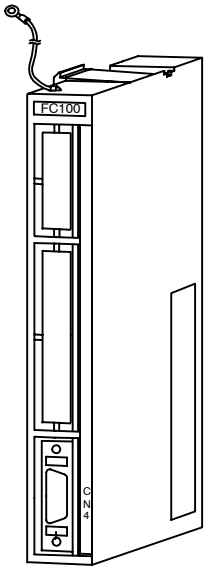


Figure 1.1 External Appearance of the Option Unit

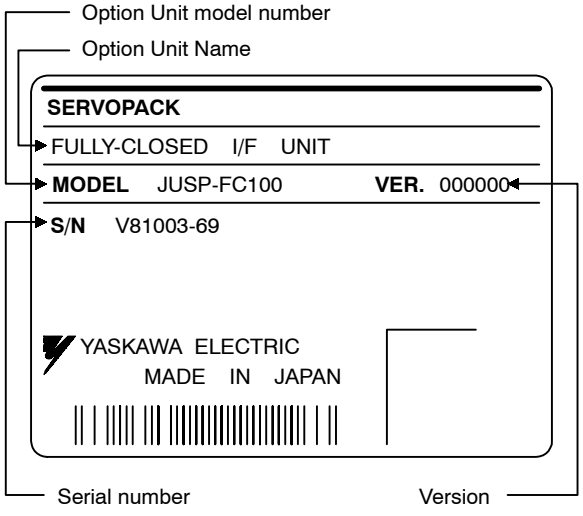


Figure 1.2 Nameplate

■ Model Numbers

Option Unit

JUSP – FC10 0

- JUSP: SERVOPACK peripheral device
- FC10: Type of device: FC10 Fully Closed Interface Unit
- 0: Design Revision Order

1.2 Product Part Names

The following diagram illustrates the product part names of the Option Unit.

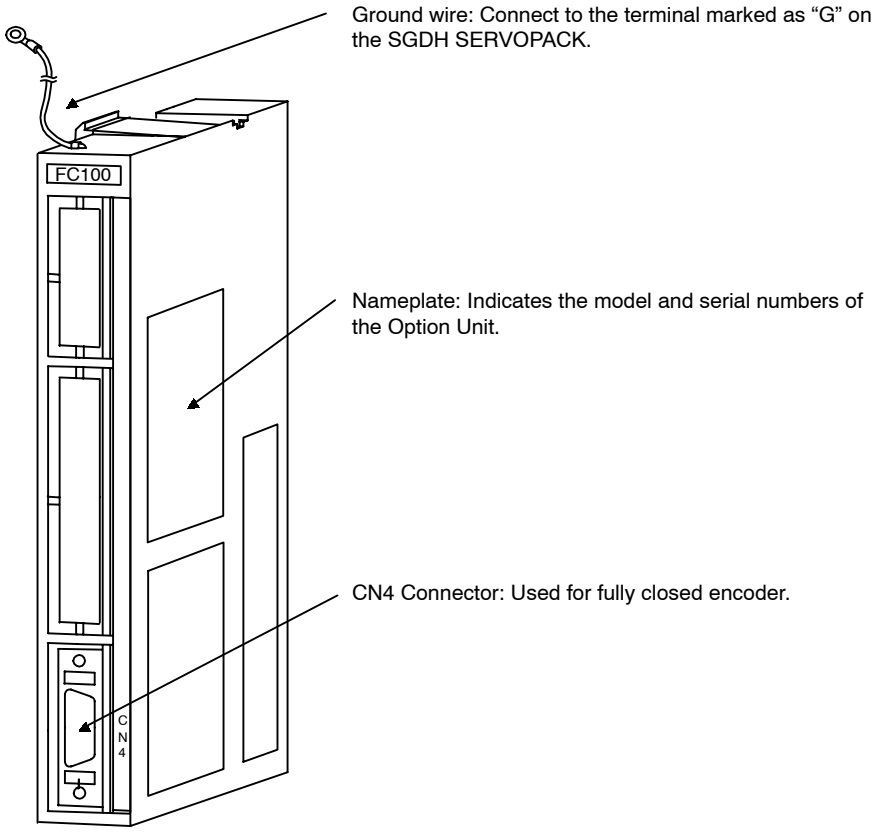

Ground wire: Connect to the terminal marked as “G” on the SGDH SERVOPACK.
FC100
Nameplate: Indicates the model and serial numbers of the Option Unit.
CN4 Connector: Used for fully closed encoder.
CN4

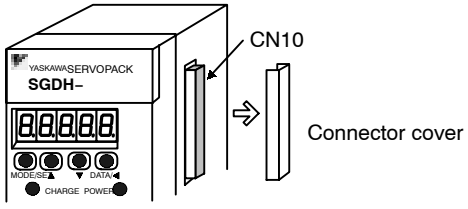
Figure 1.3 Option Unit

1.3 Mounting the Option Unit

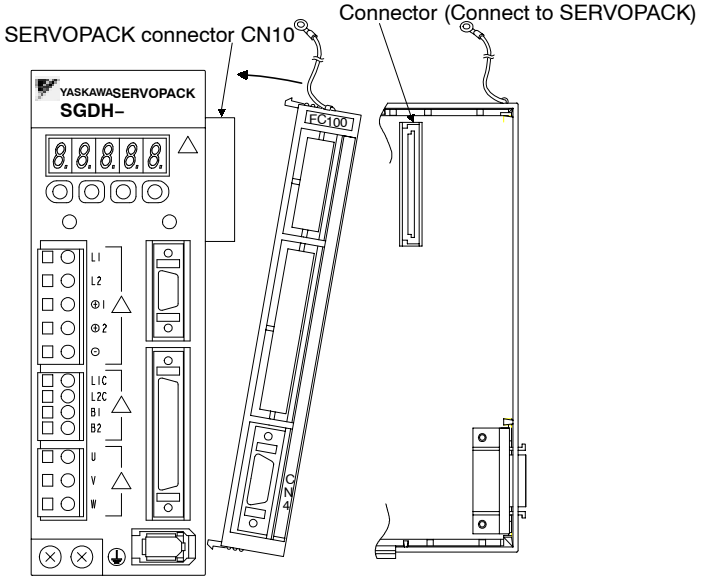
Mount a fully closed I/F unit type JUSP-FC100 on a SGDH SERVOPACK in the following manner. Provide the screws for connecting ground wire as shown below.

Mounting Method	SERVOPACK Type	Screw	Remarks
Base mounted	SGDH-A3 to 02BE SGDH-A3 to 10AE	M3 × 10 round head screws (with spring washer and plain washer)	Must be provided by customer.
	SGDH-15 to 50AE SGDH-05 to 30DE	M4 × 10 round head screw (with spring washer and plain washer)	Must be provided by customer.
	SGDH-60/75AE	M4 × 8 round head screws (with spring washer and plain washer)	Use the screw of the front panel.
Rack mounted	SGDH-A3 to 02BE-R SGDH-A3 to 50AE-R SGDH-05 to 30DE-R	M4 × 6 round head screws (with spring washer and plain washer)	Must be provided by customer. Note : Make sure that spring washers and plain washers are used for mounting. (Otherwise, the screw for connecting ground wire sticks out from the other side of the flange, and the SERVOPACK cannot be mounted properly.)
Duct ventilated	SGDH-60/75AE-P	M4 × 8 round head screws (with spring washer and plain washer)	Use the screw of the front panel.

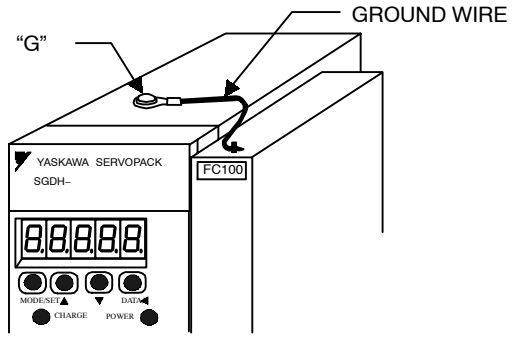
1. Remove the connector cover from the CN10 connector on the SERVOPACK.



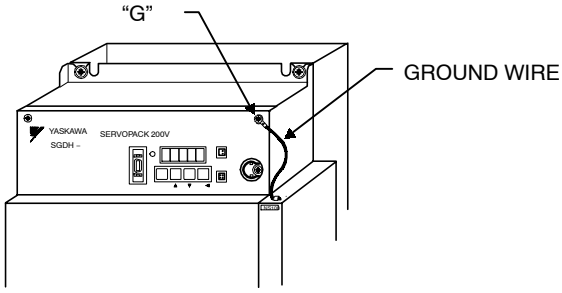
2. Mount the Option Unit on the SERVOPACK.



3. For grounding, connect a ground wire of the Option Unit to the point marked “G” on the SERVOPACK.

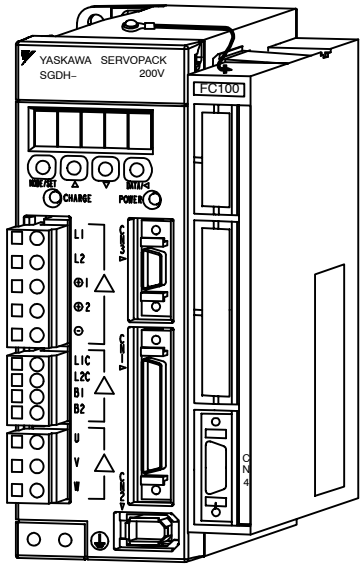


For SERVOPACK (30 W to 5.0 kW)



For SERVOPACK (6.0 kW to 7.5 kW)

When the Option Unit has been mounted correctly, the SERVOPACK will appear as shown in the following diagram.



2

Installation

This chapter describes precautions for Σ-II Series product installation.

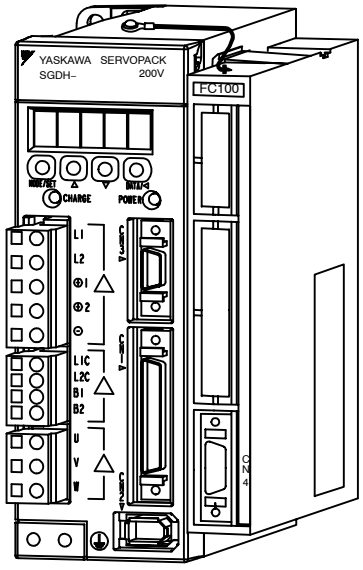
The SGDH SERVOPACKs are base-mounted servo controller. Incorrect installation will cause problems. Always observe the installation precautions shown in this chapter.

2.1 Storage Conditions . . . . . 2 - 2
2.2 Installation Site . . . . . 2 - 2
2.3 Orientation . . . . . 2 - 3
2.4 Installation . . . . . 2 - 4

2.1 Storage Conditions

Store the SERVOPACK within the following temperature range when it is stored with the power cable disconnected.

–20 to 85°C



Σ-II Series SGDH SERVOPACK
with Option Unit mounted

2.2 Installation Site

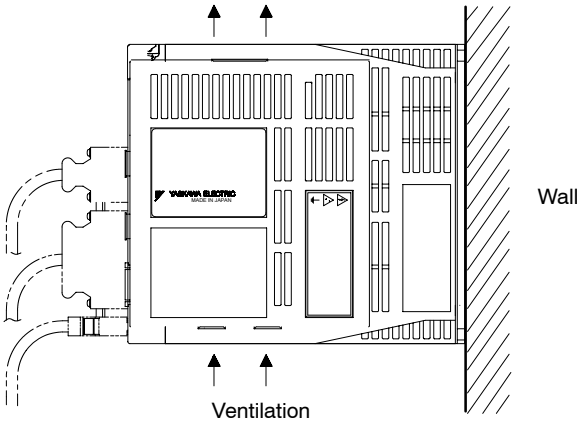
Take the following precautions at the installation site.

Situation	Installation Precaution
Installation in a Control Panel	Design the control panel size, unit layout, and cooling method so that the temperature around the SERVOPACK does not exceed 55°C.
Installation Near a Heating Unit	Minimize heat radiated from the heating unit as well as any temperature rise caused by natural convection so that the temperature around the SERVOPACK does not exceed 55°C.
Installation Near a Source of Vibration	Install a vibration isolator beneath the SERVOPACK to avoid subjecting it to vibration.
Installation at a Site Exposed to Corrosive Gas	Corrosive gas does not have an immediate effect on the SERVOPACK, but will eventually cause electronic components and contactor-related devices to malfunction. Take appropriate action to avoid corrosive gas.
Other Situations	Do not install the SERVOPACK in hot or humid locations, or locations subject to excessive dust or iron powder in the air.

2.3 Orientation

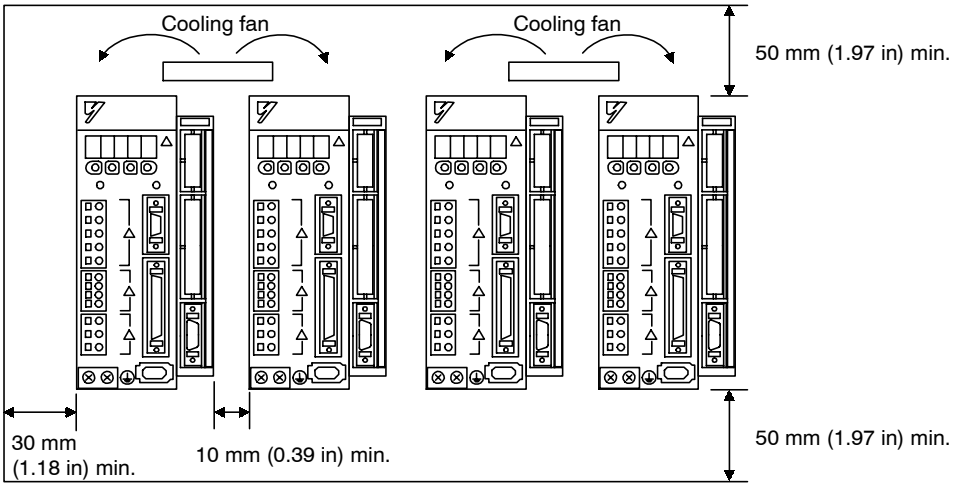
Install the SERVOPACK perpendicular to the wall as shown in the figure. The SERVOPACK must be oriented this way because it is designed to be cooled by natural convection or cooling fan.

Secure the SERVOPACK using 2 to 4 mounting holes. The number of holes depends on the SERVOPACK capacity.



2.4 Installation

Follow the procedure below to install multiple SERVOPACKs side by side in a control panel.



■ SERVOPACK Orientation

Install the SERVOPACK perpendicular to the wall so that the front panel (containing connectors) faces outward.

■ Cooling

As shown in the figure above, provide sufficient space around each SERVOPACK for cooling by cooling fans or natural convection.

■ Side-by-side Installation

When installing SERVOPACKs side by side as shown in the figure above, provide at least 10 mm (0.39 in) between and at least 50 mm (1.97 in) above and below each SERVOPACK. Install cooling fans above the SERVOPACKs to maintain a constant temperature inside the control panel and to prevent an excessive temperature rise around each SERVOPACK.

■ Environmental Conditions in the Control Panel

- Ambient Temperature: 0 to 55°C
- Humidity: 90% RH or less
- Vibration: 0.5 G (4.9 m/s^2)
- Condensation and Freezing: None
- Ambient Temperature for Long-term Reliability: 45°C max.

3

Connectors

This chapter describes the procedure used to connect Σ-II Series products to peripheral devices when an Option Unit is mounted and provides examples of combined connections.

3.1 Connecting to Peripheral Devices . . . . . 3 - 2
3.1.1 Single-phase (100 V or 200 V) Main Circuit Specifications . . . . . 3 - 2
3.1.2 Three-phase (200 V) Main Circuit Specifications . 3 - 3
3.2 SERVOPACK Internal Block Diagrams . . . 3 - 4
3.3 Fully Closed Encoder Signals Connector (CN4) . . . . . 3 - 5
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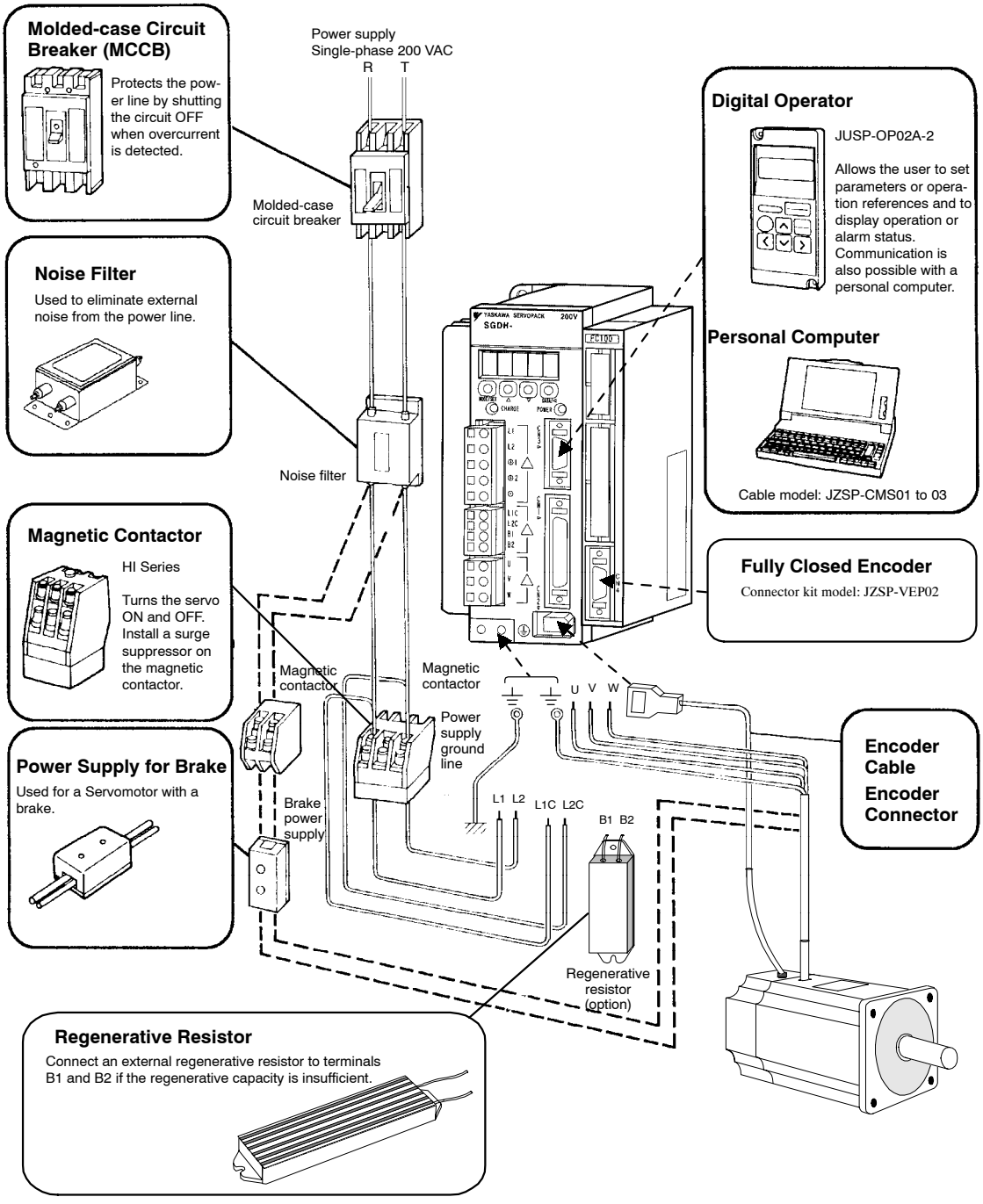
3.3.2 CN4 Connector Terminal Layout . . . . . 3 - 6
3.4 Examples of Combined Connections . . . . . 3 - 7
3.4.1 Single-phase Power Supply Specifications (for Position Control) . . . . . 3 - 7
3.4.2 Three-phase Power Supply Specifications (for Position Control) . . . . . 3 - 8

3.1 Connecting to Peripheral Devices

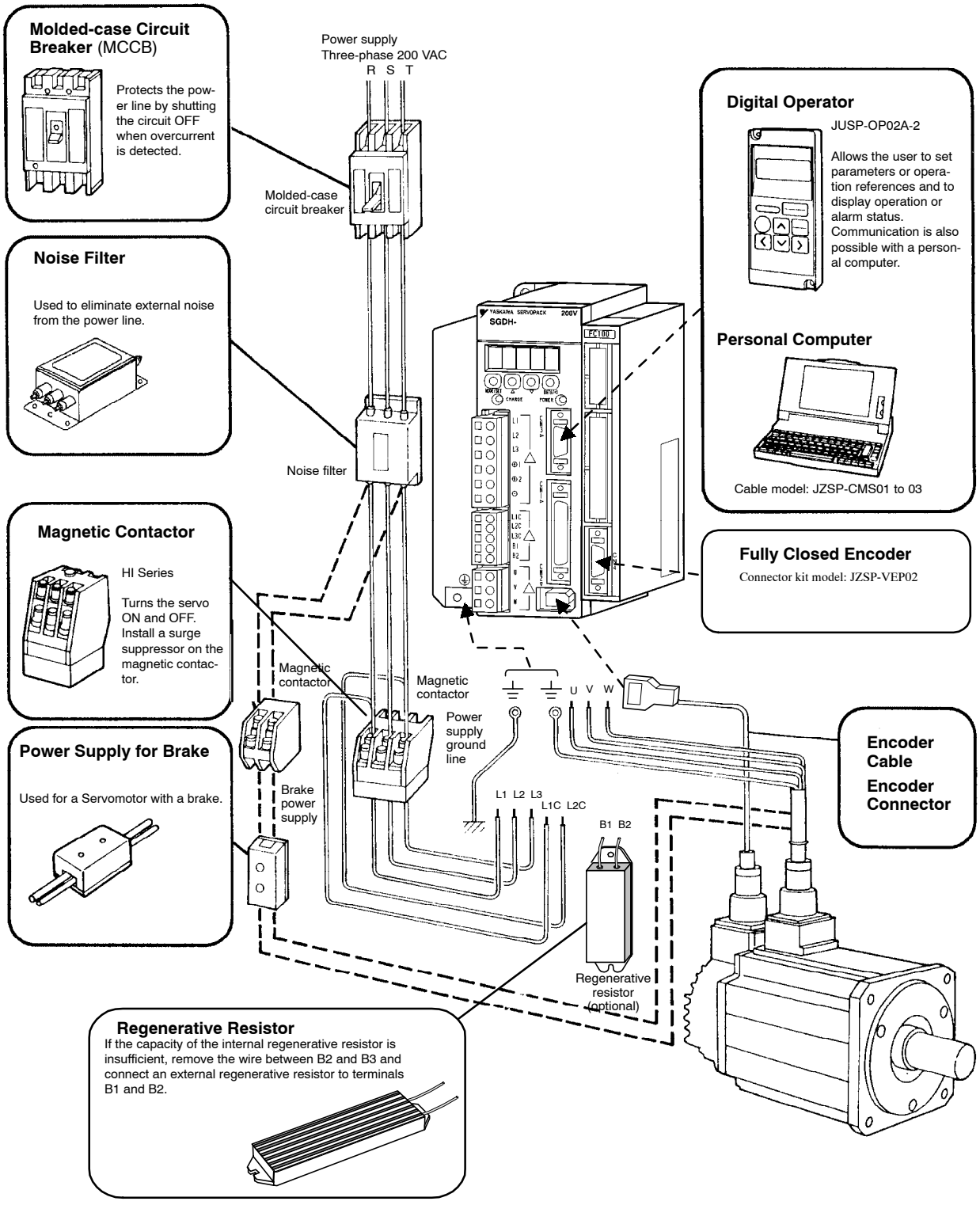
This section provides examples of standard Σ-II Series product connections to peripheral devices.

It also briefly explains how to connect each peripheral device.

3.1.1 Single-phase (100 V or 200 V) Main Circuit Specifications


Molded-case Circuit Breaker (MCCB)
Protects the power line by shutting the circuit OFF when overcurrent is detected.
Power supply
Single-phase 200 VAC
R T
Molded-case circuit breaker
Noise Filter
Used to eliminate external noise from the power line.
Noise filter
Digital Operator
JUSP-OP02A-2
Allows the user to set parameters or operation references and to display operation or alarm status. Communication is also possible with a personal computer.
Personal Computer
Cable model: JZSP-CMS01 to 03
Magnetic Contactor
HI Series
Turns the servo ON and OFF. Install a surge suppressor on the magnetic contactor.
Fully Closed Encoder
Connector kit model: JZSP-VEP02
Magnetic contactor
Magnetic contactor
Power supply ground line
U V W
Encoder Cable
Encoder Connector
Power Supply for Brake
Used for a Servomotor with a brake.
Brake power supply
L1 L2
L1C L2C
B1 B2
Regenerative resistor (option)
Regenerative Resistor
Connect an external regenerative resistor to terminals B1 and B2 if the regenerative capacity is insufficient.

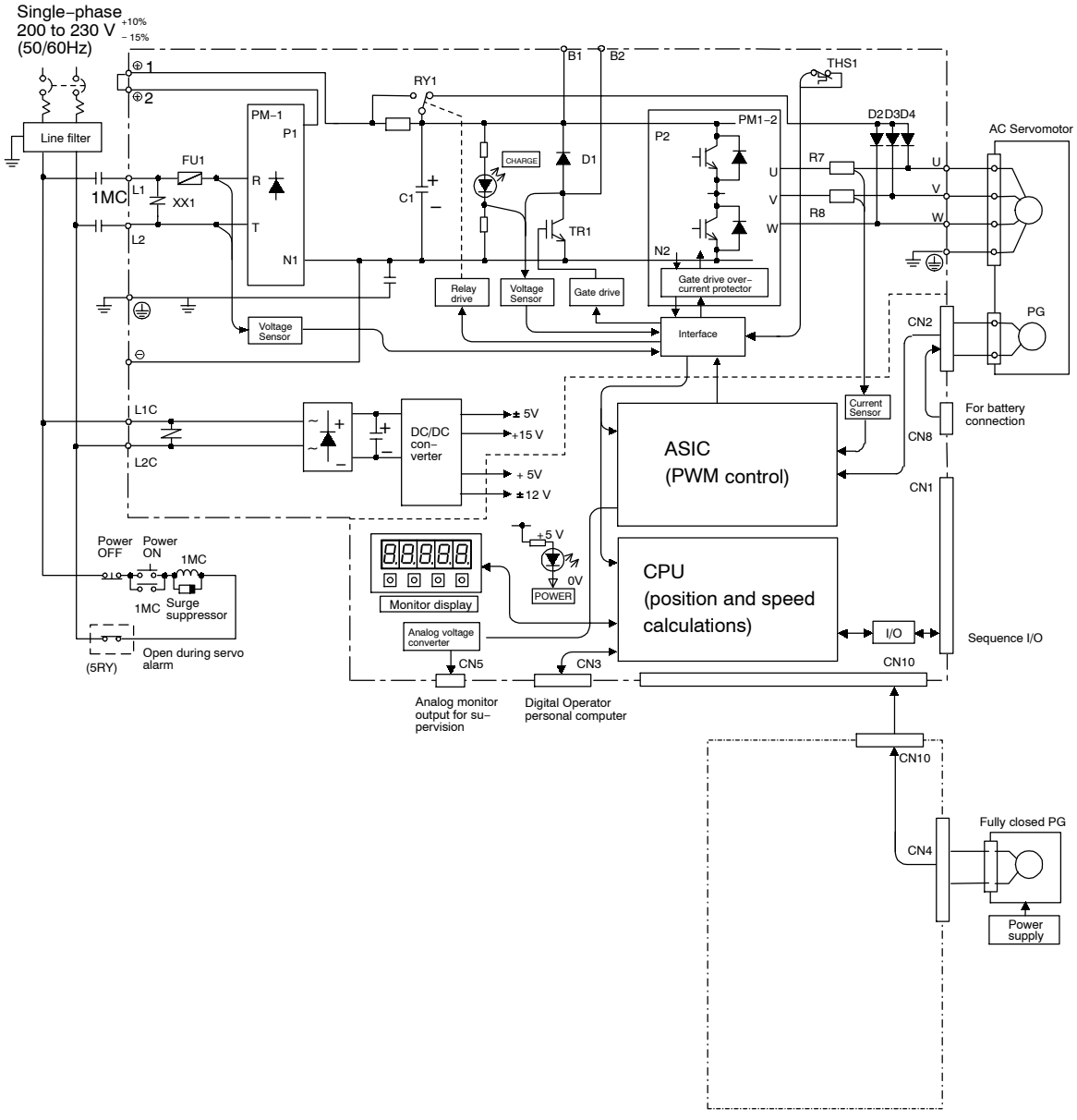
3.1.2 Three-phase (200 V) Main Circuit Specifications


Molded-case Circuit Breaker (MCCB)
Protects the power line by shutting the circuit OFF when overcurrent is detected.
Power supply
Three-phase 200 VAC
R S T
Molded-case circuit breaker
Noise Filter
Used to eliminate external noise from the power line.
Noise filter
Digital Operator
JUSP-OP02A-2
Allows the user to set parameters or operation references and to display operation or alarm status. Communication is also possible with a personal computer.
Personal Computer
Cable model: JZSP-CMS01 to 03
Fully Closed Encoder
Connector kit model: JZSP-VEP02
Magnetic Contactor
HI Series
Turns the servo ON and OFF. Install a surge suppressor on the magnetic contactor.
Magnetic contactor
Magnetic contactor
Power supply ground line
U V W
Encoder Cable
Encoder Connector
Power Supply for Brake
Used for a Servomotor with a brake.
Brake power supply
L1 L2 L3
L1C L2C
B1 B2
Regenerative resistor (optional)
Regenerative Resistor
If the capacity of the internal regenerative resistor is insufficient, remove the wire between B2 and B3 and connect an external regenerative resistor to terminals B1 and B2.

3.2 SERVOPACK Internal Block Diagrams

The following sections show an internal block diagram for the SERVOPACK with an Option Unit.

30 to 400 W 200-V and 30 to 200 W 100-V Models

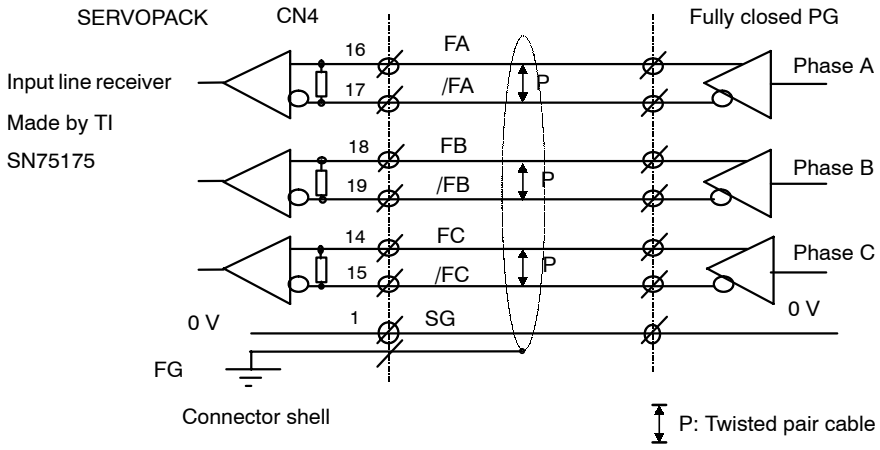


3.3 Fully Closed Encoder Signals Connector (CN4)

This section describes the wiring required to connect the fully closed encoder signals connector (CN4) to the fully closed encoder.

3.3.1 Fully Closed Encoder Connection Example

The following diagram shows an example of CN4 connections.



Note The SERVOPACK does not provide power supply for the fully closed PG, so it must be provided by the customer.

3.3.2 CN4 Connector Terminal Layout

The following diagram shows the CN4 connector terminal layout and connector specifications.

■ CN4 Connector Terminal Layout

2	SG	GND	1	SG	GND	12	–	–	11	–	–
4	–	–	3	SG	GND	14	FC	Fully closed PG input for phase C	13	–	–
6	–	–	5	–	–	16	FA	Fully closed PG input for phase A	15	/FC	Fully closed PG input for phase C
8	–	–	7	–	–	18	FB	Fully closed PG input for phase B	17	/FA	Fully closed PG input for phase A
10	–	–	9	–	–	20	–	–	19	/FB	Fully closed PG input for phase B

Note 1. Do not connect anything to empty terminals.

2. Connect the cable shield to the connector shell. It is connected to the frame ground (FG) through the connector on the SERVOPACK end.

■ CN4 Specifications

Specifications for SERVOPACK Connectors	Applicable Receptacles		
	Soldered	Case	Manufacturer
10220-52A2JL 20-pin Right Angle Plug	10120-3000VE	10320-52A0-008	SUMITOMO 3M LTD.

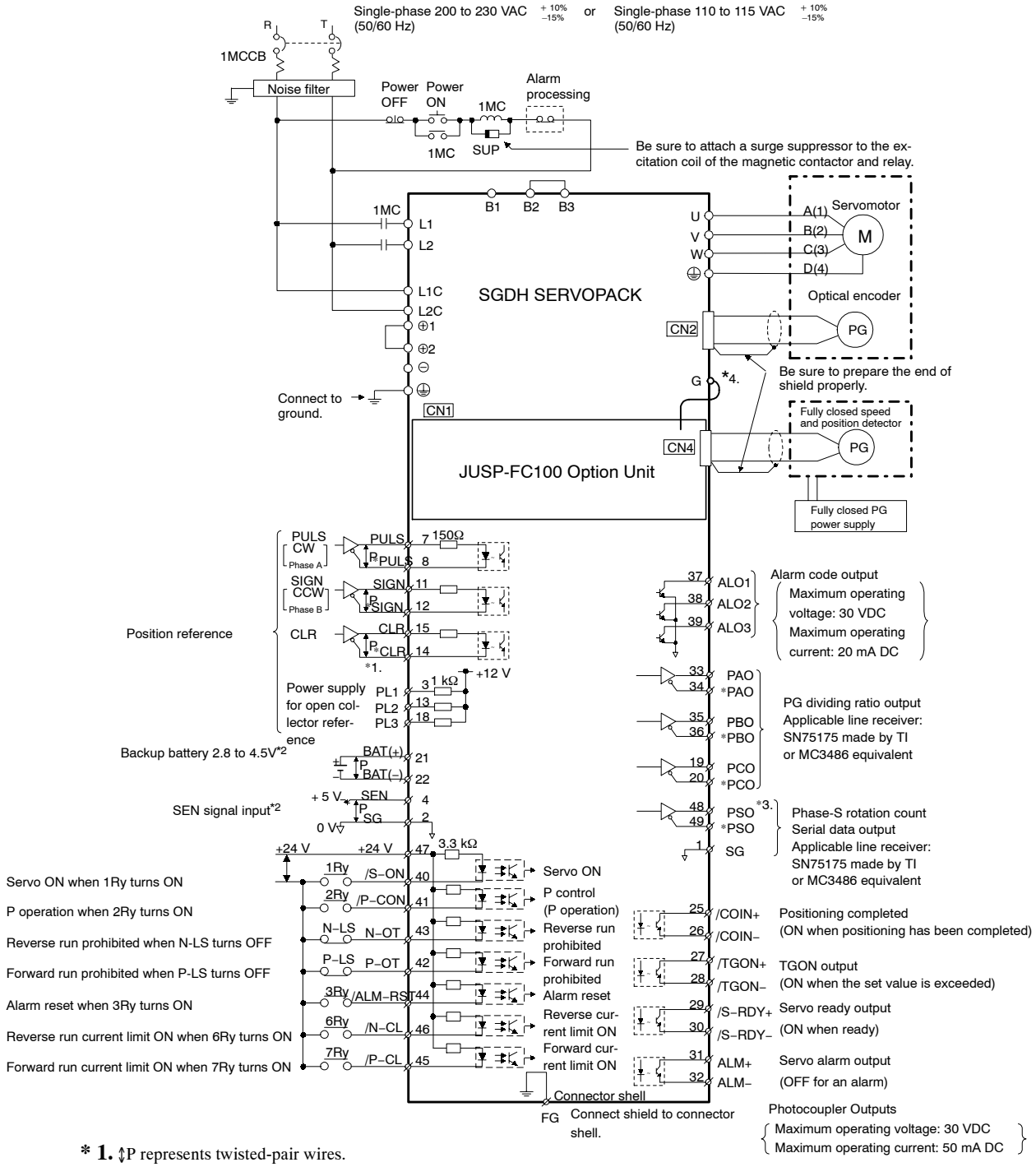
Note 1. Use shielded twisted pair cables with AWG24 or AWG26 wires. The finished cable outside diameter must be 11.6 mm max.

2. The JZSP-VEP02 Connector Kit is available.

3.4 Examples of Combined Connections

The following diagrams show examples of combined connections.

3.4.1 Single-phase Power Supply Specifications (for Position Control)



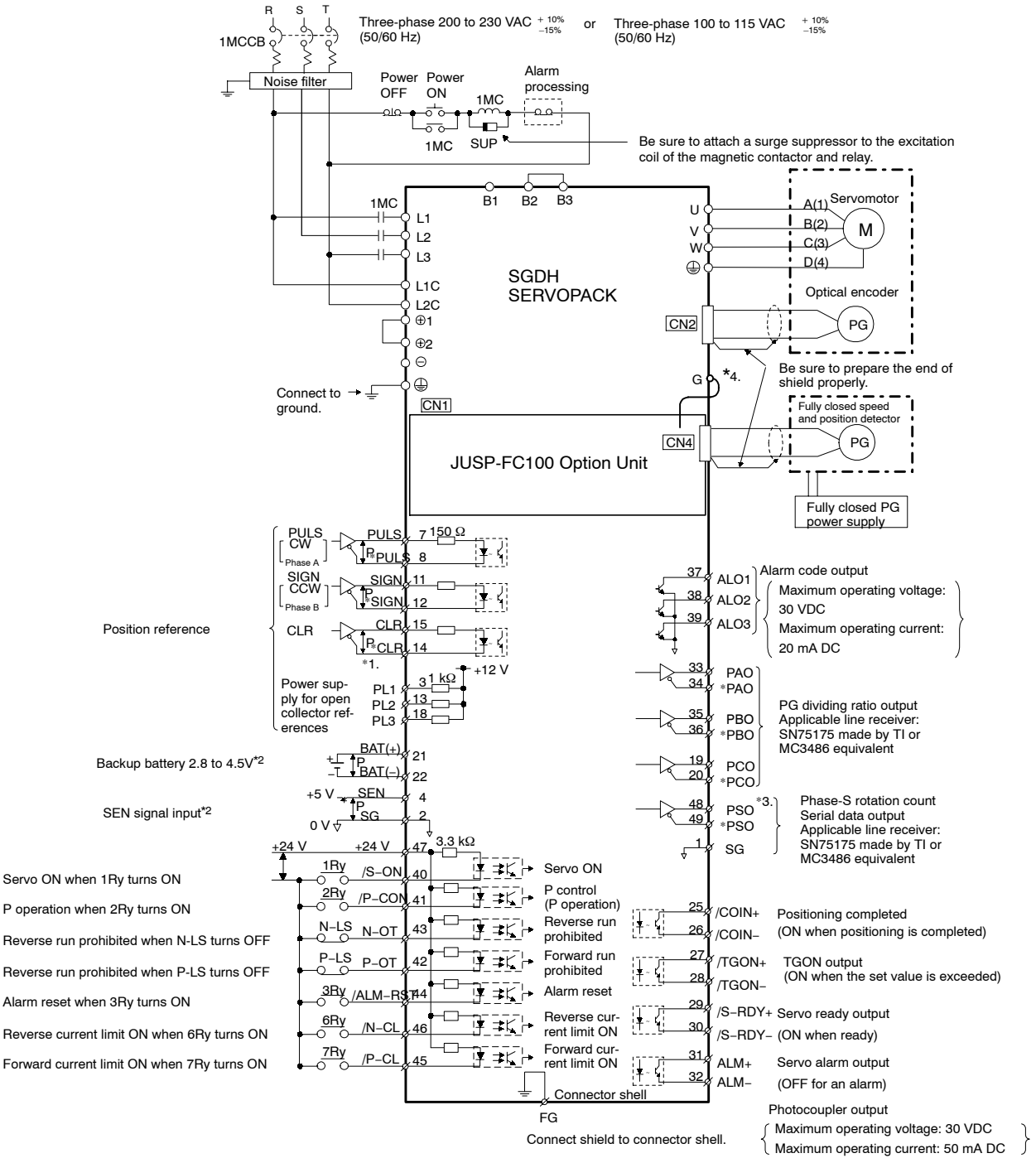
*** 1.** ↕P represents twisted-pair wires.

*** 2.** Connect when using an absolute encoder.

*** 3.** Valid when using an absolute encoder.

*** 4.** Connect the ground wire of the Option Unit to the point marked "G" on the SERVOPACK. (Refer to *1.3 Mounting the Option Unit*.)

3.4.2 Three-phase Power Supply Specifications (for Position Control)



*** 1.** ↕P represents twisted-pair wires.

*** 2.** Connect when using an absolute encoder.

*** 3.** Valid when using an absolute encoder.

*** 4.** Connect the ground wire of the Option Unit to the point marked "G" on the SERVOPACK. (Refer to *1.3 Mounting the Option Unit*.)

4

Trial Operation

This chapter describes the check items before trial operation and the parameters required for trial operation.

4.1 Check Items before Trial Operation . . . . . 4 - 2
4.2 Parameters Required for Trial Operation . . . . . 4 - 2

4.1 Check Items before Trial Operation

Conduct trial operation after wiring has been completed.

Inspect and check the following items when performing trial operation, and be sure to conduct trial operation safely.

Refer to *Chapter 4 Trial Operation* of the *Σ-II Series SGM□H/SGDH User's Manual* (SIE-S800-32.2) for details on trial operation.

- Before conducting trial operation for fully closed control, check the fully closed encoder and other relevant settings. If the settings are incorrect, there will be a risk of the motor going out of control. Conduct initial trial operation by setting the Pn505 parameter (overflow level) to 1 (minimum value) to check the operation at low speed.

4.2 Parameters Required for Trial Operation

This section describes the minimum parameters required for trial operation with fully closed encoder specifications.

■ Parameters

Refer to *7.1.6 Operation in User Constant Setting Mode* of the *Σ-II Series SGM□H/SGDH User's Manual* (SIE-S800-32.2) for details on the setting of each parameter.

Turn OFF power once after changing any parameter. The change will be valid when power is turned ON again.

Pn202	Electronic Gear Ratio (Numerator)	See *5.2*
Pn203	Electronic Gear Ratio (Denominator)	See *5.2*

Changing Servomotor Rotation Direction

Use the following parameter to reverse the direction of rotation.

Pn000.0	Function Selection Basic Switches: Direction Selection	See 5.2

Fully Closed Encoder Specifications

Use the following parameters to conduct trial operation with fully closed encoder specifications.

Pn002.3	Usage of fully closed encoder	See 5.2
Pn206	Number of fully closed pulses	See 5.2

5

Parameter Settings and Functions

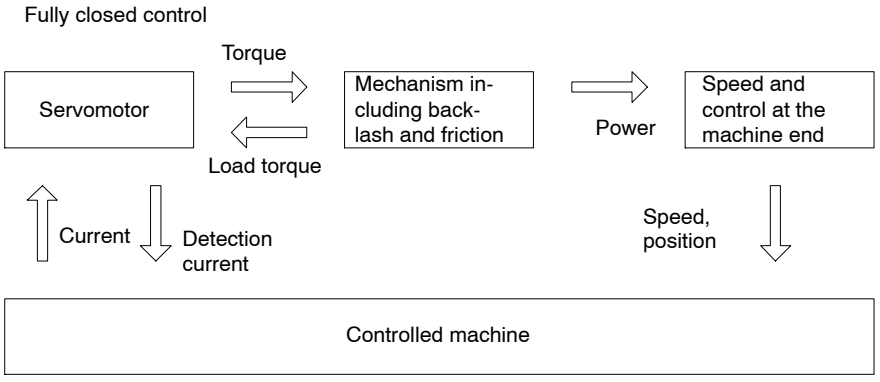
This chapter describes how to set parameters and use functions when using fully closed system specifications.

5.1 Fully Closed System ..... 5 - 2
5.1.1 Fully Closed Control ..... 5 - 2
5.1.2 Fully Closed System Specifications ..... 5 - 2
5.2 Setting Parameters ..... 5 - 4

5.1 Fully Closed System

5.1.1 Fully Closed Control

In previous SERVOPACKs, a semi-closed method was used to control the motor. In the SGDH SERVOPACK, however, a fully closed loop can be created using the parameter settings. With this function even more precise control is achieved because control involves the detection of the position and speed of actual machine operation.



Parameters must be set when using fully closed control. Refer to *5.2 Setting Parameters* for details.

5.1.2 Fully Closed System Specifications

This section describes the fully closed system specifications of the SGDH SERVOPACK when an Option Unit is mounted.

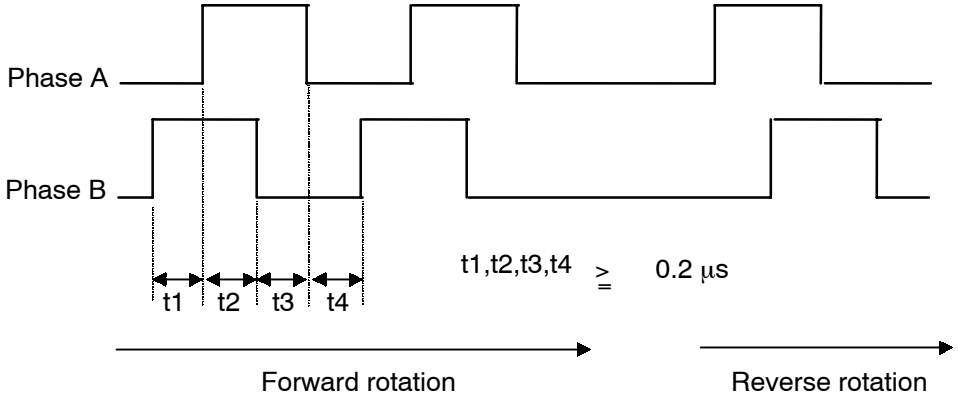
■ Fully Closed Encoder Pulse Output Form

5-V Differential line driver output (complies with EIA Standard RS-422A)

■ Fully Closed Encoder Pulse Signal Form

90° Phase difference 2-phase differential pulse: phase A, phase B

Maximum receivable frequency for SERVOPACK: 1 Mbps



■ Encoder Signal Output from SERVOPACK

If settings are made to use fully closed encoder pulses (refer to *5.2 Setting Parameters*), the PAO, PBO, and PCO output signal terminals of the CN1 connector on the SGDH SERVOPACK will directly output fully closed encoder pulses. Encoder dividing ratio settings will be ignored.
If settings are made to use fully closed encoder pulses in reverse rotation mode, PBO output signals will be inverted.

■ Control Mode

Fully closed control is applicable to position control mode only. This mode can be switched to another control mode during operation. Refer to *5.3.5 Control Mode* Selection of the Σ-*II Series SGM□H/SGDH User's Manual* (SIE-S800-32.2) for details.
If position control mode is switched to another control mode, semi-closed control will be performed, which differs from ordinary control with regard to the following points.

- PAO, PBO, and PCO output signals are fully closed encoder pulses.
- Fully closed encoder open circuit can be detected.

■ Selecting Motor Encoders

Either incremental or absolute encoders can be used.
When using an absolute encoder, note that semi-closed control differs from ordinary control with regard to the following points.

- No SEN signal input is required.
- The PAO signal does not contain absolute value information (fully closed encoder pulses will be output). If absolute value information on the motor encoder is required, use the PSO signal.

5.2 Setting Parameters

This section describes the parameters that must be set when using an Option Unit.

■ Fully Closed Encoder

Set the method for using the fully closed encoder.

Pn002.3	Fully Closed Encoder Usage Method	Factory Setting: 0	Position Control

The setting details are as follows:

Parameters	Setting	Meaning
Pn002.3	0 (Factory setting)	Fully closed encoder is not used.
	1	Fully closed encoder is used without phase C.
	2	Fully closed encoder is used with phase C.
	3	Fully closed encoder is used in Reverse Rotation Mode without phase C.
	4	Fully closed encoder is used in Reverse Rotation Mode with phase C.

Setting this parameter to 0 allows operation to be performed in ordinary semi-closed control mode.

When changes have been made to this parameter, turn OFF the power once. The set value will become effective when the power is turned ON again.

■ Number of Fully Closed Encoder Pulses

Set the number of fully closed encoder pulses for each motor rotation.

When the number of fully closed encoder pulses per motor rotation is not an integer, set the closest integer.

Error will occur in the speed monitor for position loop gain, feed forward, and reference pulse, but no position displacement will occur. Set the number of pulses with a multiplication factor of 1.

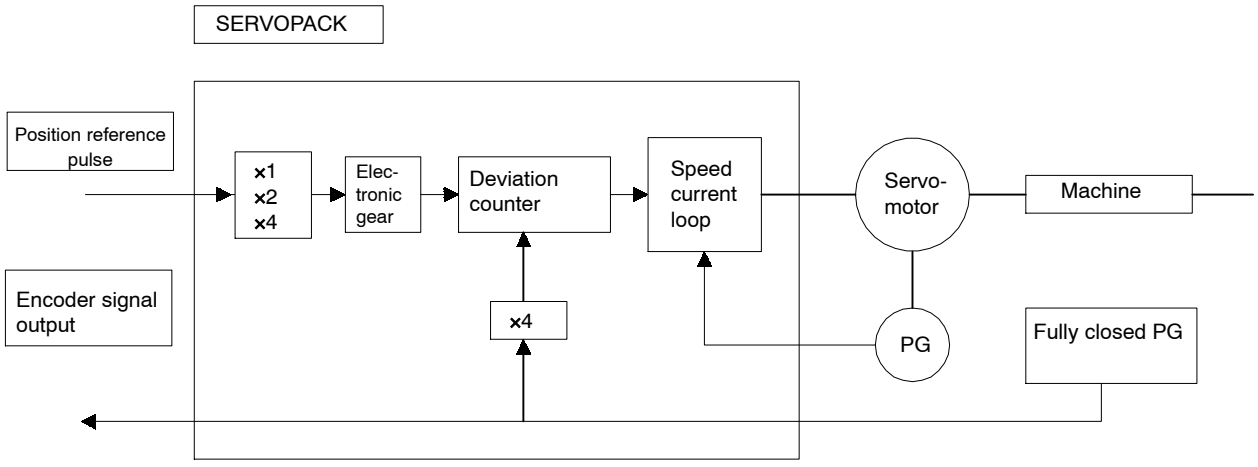
Pn206	Number of Fully Closed Encoder Pulses	Unit P/R	Setting Range: 513 to 65535	Factory Setting: 16384	Position Control

When changes have been made to this parameter, turn OFF the power once. The set value will become effective when the power is turned ON again.

■ Electronic Gears

The electronic gear settings for fully closed operation are different from those for semi-closed operations.

For information on the parameters, refer to *5.2.5 Using the Electronic Gear Function* of the Σ-*II Series SGM□H/SGDH User's Manual* (SIE-S800-32.2).



5

■ Reverse Rotation Settings

The settings shown in the following table must be made in order to used the Reverse Rotation Mode.

Making the settings carefully. Errors may cause the motor to run out of control.

Direction of Motor as Viewed from Load for Forward Rotation	Relation between Fully Closed PG during Forward Rotation Input Phase	Pn000.0 Setting	Pn002.3 Setting	Relation Between Fully Closed PG during CCW Rotation as Viewed from Motor load Input Phase
CCW direction	Figure 5.1	0	1, 3	Figure 5.1
	Figure 5.2		2, 4	Figure 5.2
CW direction	Figure 5.1	1	1, 3	Figure 5.1
	Figure 5.2		2, 4	Figure 5.2

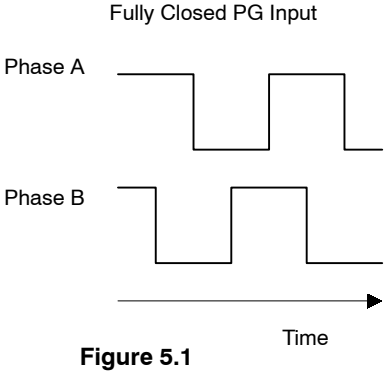


Figure 5.1

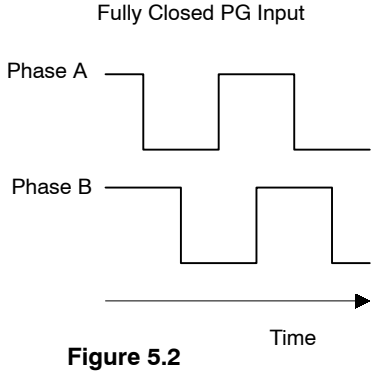


Figure 5.2

Both Pn000.0 and Pn002.3 can be used to change the rotational direction during normal operation. If the motor runs out of control, change either Pn000.0 or Pn002.3.

When Pn002.3 is set to 2 or 4, PBO output signals will be inverted.

6

Ratings, Specifications, and Dimensional Drawings

This chapter provides the ratings, specifications, and dimensional drawings of the Option Unit.

6.1 Ratings and Specifications . . . . . 6 - 2
6.2 Dimensional Drawings . . . . . 6 - 3
6.2.1 Option Unit . . . . . 6 - 3
6.2.2 SERVOPACKs . . . . . 6 - 4

6.1 Ratings and Specifications

The following table shows ratings and specifications for the Option Unit.

Table 6.1 Option Unit Ratings and Specifications

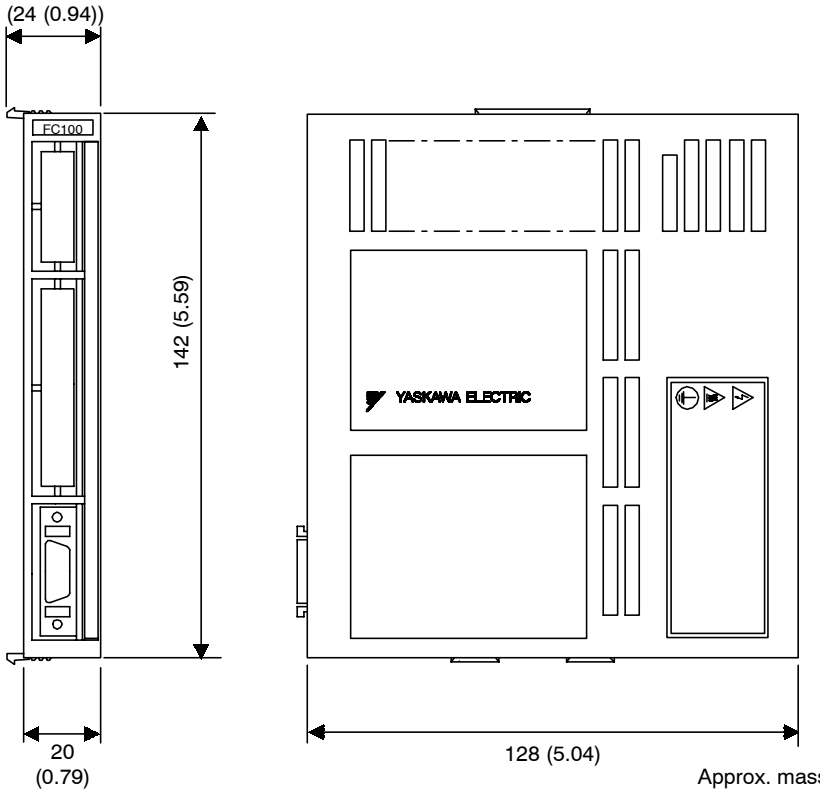
Item		Details
Applicable SERVOPACK		All SGDH-□□□E models
Installation Method		Mounted on the SGDH SERVOPACK.
Basic Specifications	**Power Consumption [W]**	0.5 max.
	External Dimensions [mm]	20 × 142 × 128 (W × H × D)
	Approx. Mass [kg] (lb)	0.2 (0.44)
Fully Closed System Specifications	**Fully Closed Encoder Pulse Output Form**	5-V differential line driver output (complies with EIA Standard RS-422A)
	Fully Closed Encoder Pulse Signal Form	90° Phase difference 2-phase differential pulse (phase A, phase B)
	Maximum Receivable Frequency for SERVOPACK	1 Mbps
	Power Supply for Fully Closed Encoder	To be prepared by customer
Internal Functions	**Protection**	Fully closed encoder open circuit detection
	Reverse Rotation	Set by parameters

6.2 Dimensional Drawings

Dimensional drawings of the Option Unit and SERVOPACKs are shown below.

6.2.1 Option Unit

Dimensions of the Option Unit are shown below.



Approx. mass: 0.2 kg (0.44 lb)

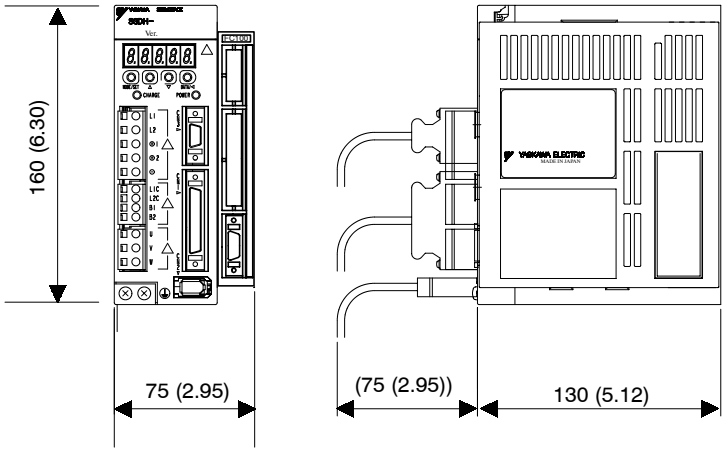
6.2.2 SERVOPACKs

Dimensional drawings of the Base-mounted Standard SERVOPACKs (with Option Unit mounted) are shown below.

■ Base-mounted Models

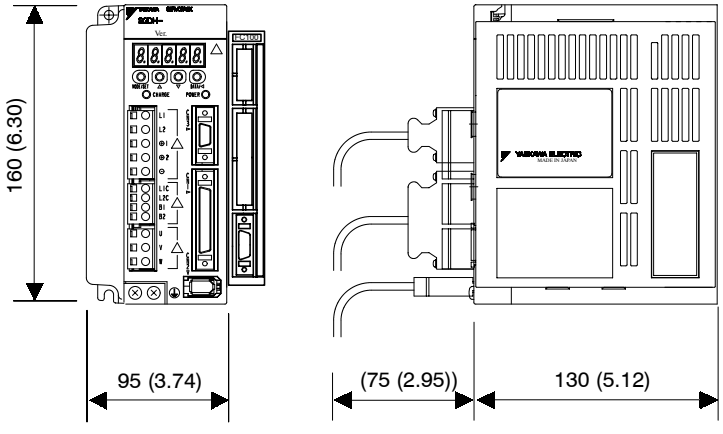
Unit: mm (in)

SGDH-A3AE to -02AE (Single-phase, 200 V, 30 to 200 W)
SGDH-A3AE to -01BE (Single-phase, 100 V, 30 to 100 W)



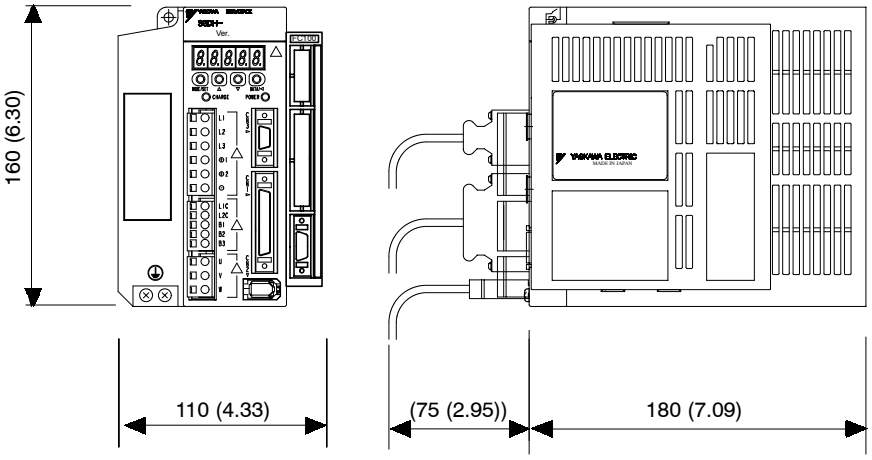
Approx. mass: 1.0 kg (2.21 lb)

SGDH-04AE (Single-phase, 200 V, 400 W)
SGDH-02BE (Single-phase, 100 V, 200 W)



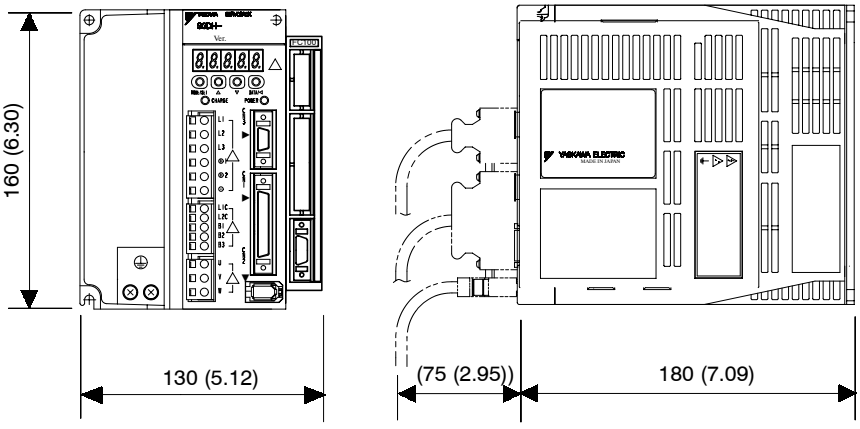
Approx. mass: 1.3 kg (2.87 lb)

SGDH-05AE to-10AE (Three-phase, 200 V, 0.5 to 1.0 kW)



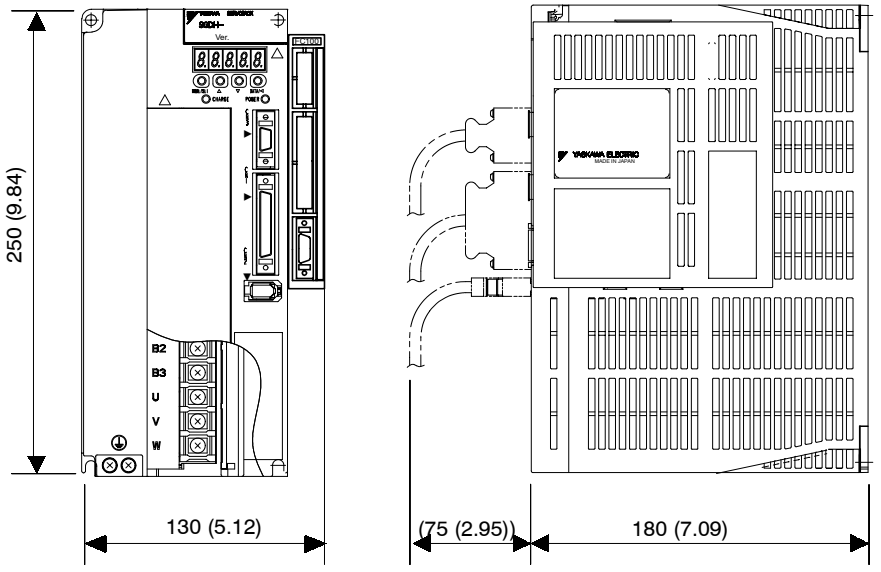
Approx. mass: 1.9 kg (4.19 lb)

SGDH-15AE (Three-phase, 200 V, 1.5 kW)



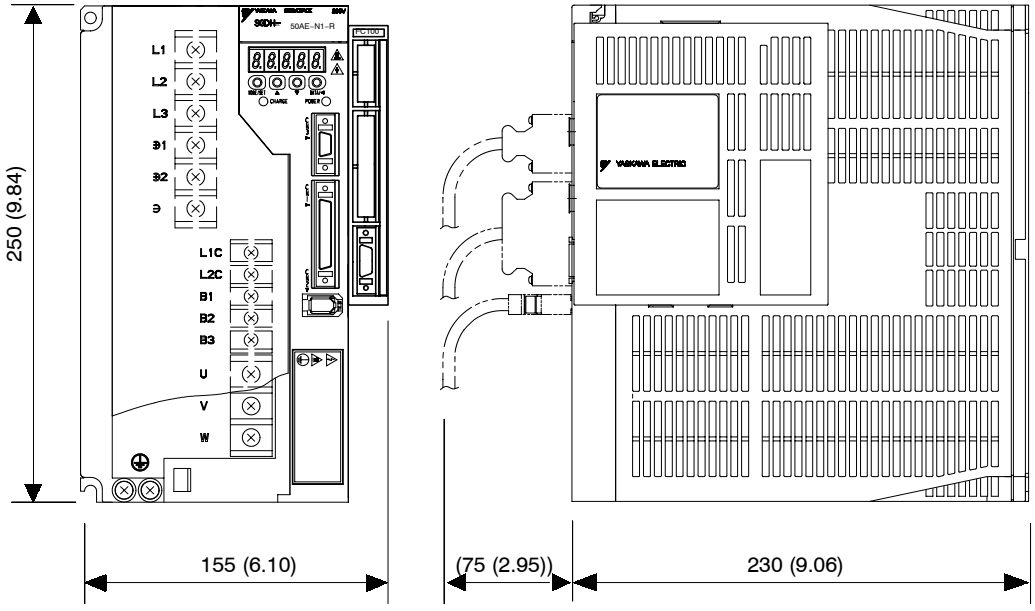
Approx. mass: 3.0 kg (6.61 lb)

SGDH-20AE, -30AE (Three-phase, 200 V, 2.0 kW, 3.0 kW)



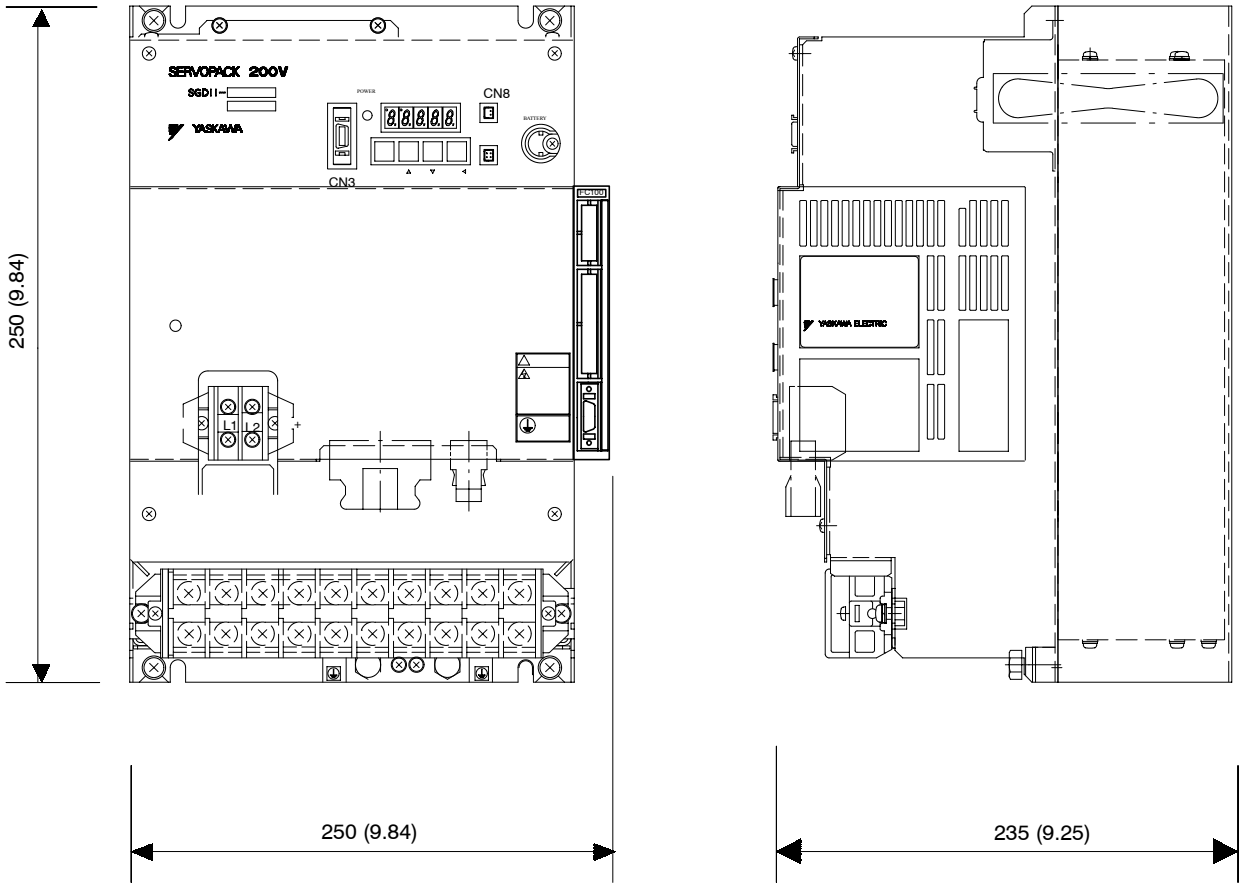
Approx. mass: 4.0 kg (8.82 lb)

SGDH-50AE (Three-phase, 200 V, 5.0 kW)



Approx. mass: 5.7 kg (12.57 lb)

SGDH-60AE, -75AE (Three-phase, 200 V, 6.0 kW, 7.5 kW)



Approx. mass: 15.0 kg (33.07 lb)

7

Troubleshooting

This chapter describes troubleshooting procedures for Servodrives with an Option Unit.

7.1 Troubleshooting Problems with Alarm Displays . . . . . 7 - 2
7.2 Troubleshooting Problems with No Alarm Display . . . . . 7 - 4

7.1 Troubleshooting Problems with Alarm Displays

This section describes alarms that will be added when an Optional Unit is mounted. Refer to the Σ-*II Series SGM□H/SGDH User's Manual* (SIE-S800-32.2) for details on alarms not listed in this section.

Problems that occur in the Servodrives are displayed on the panel operator as "A.□□" or "CPF-□□." "A.– –," however, does not indicate an alarm. Refer to the following sections to identify the cause of an alarm and the action to be taken.

Contact your Yaskawa representative if the problem cannot be solved by the described procedures.

■ A.C6

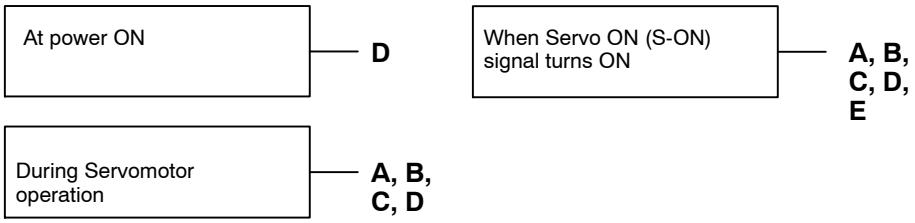
A.C6: Fully Closed Encoder Phase-A/-B Open Circuit Alarm

Display and Outputs

Alarm Outputs			
Alarm Code Outputs			ALM Output
ALO1	ALO2	ALO3	
ON	OFF	ON	OFF

Note OFF: Output transistor is OFF (alarm state). ON: Output transistor is ON.

Status and Remedy for Alarm



Cause		Remedy
A	Fully closed encoder wiring error, faulty contact, or open circuit.	Check the wiring and check that the connector is fully inserted on the encoder side.
B	There is noise in the fully closed encoder wiring.	Separate the fully closed encoder wiring from the main circuit.
C	The fully closed encoder is defective or OFF.	Replace the fully closed encoder or turn ON the power.
D	SERVOPACK is defective.	Replace SERVOPACK.
E	Although no fully closed encoder is connected, the Pn002.3 parameter is set to 1, 2, 3, or 4.	Set the Pn002.3 parameter to 0.

■ A.C7

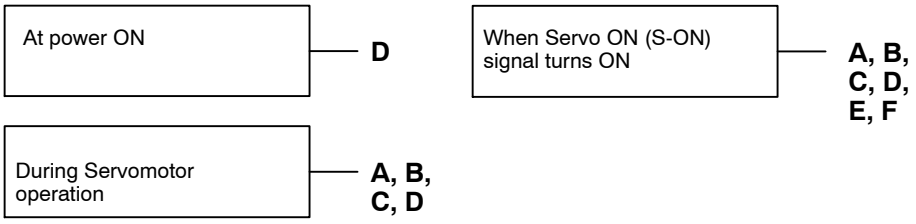
A.C7: Fully Closed Encoder Phase-C Open Circuit Alarm

Display and Outputs

Alarm Outputs			
Alarm Code Outputs			ALM Output
ALO1	ALO2	ALO3	
ON	OFF	ON	OFF

Note OFF: Output transistor is OFF (alarm state). ON: Output transistor is ON.

Status and Remedy for Alarm



Cause		Remedy
A	Fully closed encoder wiring error, faulty contact, or open circuit.	Check the wiring and check that the connector is fully inserted on the encoder side.
B	There is noise in the fully closed encoder wiring.	Separate the fully closed encoder wiring from the main circuit.
C	The fully closed encoder is defective or OFF.	Replace the fully closed encoder or turn ON the power.
D	SERVOPACK is defective.	Replace SERVOPACK.
E	Although no fully closed encoder is connected, the Pn002.3 parameter is set to 1, 2, 3, or 4.	Set the Pn002.3 parameter to 0.
F	Although no fully closed encoder for phase C is connected, the Pn002.3 parameter is set to 2 or 4.	Set the Pn002.3 parameter to 1 or 3.

■ Supplementary Information on A.C6 and A.C7

- When Pn002.3 = 0, neither A.C6 nor A.C7 will be detected.
  When Pn002.3 = 1 or 3, only A.C6 will be detected.
  When Pn002.3 = 2 or 4, both A.C6 and A.C7 will be detected.
- When Pn002.3 = 1, 2, 3, or 4, open circuit will be detected while the motor is ON even if the control mode is not fully closed control mode (such as jogging mode).
- Open circuit is detected when no current flows through the terminating resistor inside the SERVOPACK. Therefore, alarm A.C6 or A.C7 will also be activated when the power supply for the fully closed PG line driver is shut down.

7.2 Troubleshooting Problems with No Alarm Display

Refer to the tables below to identify the cause of a problem which causes no alarm display and take the remedy described.

Also refer to *9.2.2 Troubleshooting Problems with No Alarm Display* of the Σ-*II Series SGM□H/SGDH User's Manual* (SIE-S800-32.2).

Contact your Yaskawa representative if the problem cannot be solved by the described procedures.

Table 7.1 Troubleshooting Problems with No Alarm Display

Symptom	Cause	Remedy
When a command is input, the motor reverses out of control.	The fully closed encoder phases are incorrect.	Correct the wiring or the Pn002.3 setting.
When a command is input, the motor continues to run.	No fully closed encoder pulses are output.	Check the fully closed encoder.

Σ-Ⅱ SERIES SGDH
FULLY CLOSED INTERFACE UNIT
USER'S MANUAL

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice
for ongoing product modifications and improvements.

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